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TITAN
BROADCAST COMMUNICATION SYSTEMS



10 August 1993

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington D.C. 20554

**Regarding:** Cable Regulation Proceeding on Compatibility Between Cable Systems and Consumer Electronics Equipment
ET Docket No. 93-7

Dear Ms. Searcy,

Enclosed are the original and nine copies of the Reply Comments filed by **The Titan Corporation** ("**Titan**") in the above-referenced proceedings.

Please address any questions concerning this letter to the undersigned.

Sincerely,

Charles F. Newby
Director,
Broadcast Communication Systems

Enclosures

No. of Copies rec'd 0+9
List ABCDE

THE TITAN CORPORATION
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TEL (619) 552-9797 • FAX (619) 597-9055

Before the
**FEDERAL COMMUNICATIONS COMMISSION**
Washington, D.C. 20554



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| In the Matter of | ) | |
| | ) | |
| Implementation of Section 17 of the Cable Television Consumer Protection and Competition Act of 1992 | ) | ET Docket No. 93-7 |
| | ) | |
| | ) | |
| Compatibility Between Cable Systems and Consumer Electronics Equipment | ) | |

# REPLY COMMENTS OF THE TITAN CORPORATION.

August 10, 1993

The Titan Corporation
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San Diego CA 92121
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# REPLY COMMENTS

## 1 INTRODUCTION

The Titan Corporation ("Titan"), hereby respectfully replies to the supplemental comments[1] of a group formed by the National Cable Television Association and the Consumer Electronics Group of the Electronic Industries Association ("NCTA-CEG") as submitted in response to the Federal Communications Commission's ("Commission") Notice Of Inquiry in the above-captioned proceeding ("NOI"). Titan has a strong interest in the Commission's implementation of the Cable Television Consumer Protection and Competition Act of 1992[2] ("Cable Act") in general and Section 17 in particular, because of its substantial involvement and familiarity in the development, manufacture and sale of television access control encryption technologies that are so intimately intertwined with the compatibility issues the Commission is concerned with in the instant proceeding. Furthermore, Titan's investment and experience in efforts to introduce competition in the supply of equipment for satellite television encryption,

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[1] Supplemental Comments Cable-Consumer Electronics Compatibility Advisory Group, July 21, 1993 In the Matter of Implementation of Section 17 of the Cable Television Consumer Protection and Competition Act of 1992, Compatibility Between Cable Systems and Consumer Electronics Equipment. ET Docket No. 93-7. (Hereinafter referred to as "NCTA-CEG Supplemental Comments").

[2] Pub. L. No. 102-385, 102 Stat. 1460 (1992).

uniquely qualifies it to provide an important perspective on the various proposals submitted by NCTA-CEG.

From the outset, Titan applauds the efforts and cooperative work of both industries that led to the creation of this compromise document as presented by the NCTA-CEG. It is clear that both the cable industry and the consumer electronics industry now recognize the need to establish standards for transmission, decompression and security interfaces. Titan supports this central position by the NCTA-CEG group in order to achieve the compatibility goals sought by Congress when it enacted Section 17 of the Cable Act.

The NCTA-CEG presents recommendations for cable - consumer electronics compatibility enhancement measures to be applied in two different time frames that it defines as "short term" and "longer term". They suggest that the "short term measures" are directed toward consumer electronics equipment already purchased, or will have been purchased by the time Commission rules governing compatible interfaces for such equipment take effect. The "longer term" measures pertain to hardware design modifications in new TV's and VCR's that include receiver front-end RF specifications, decoder interfaces and setting standards for digital transmission, compression and access control interfaces. While we have serious doubts as to the advisability of some of the recommended short term measures[3], we focus in these reply comments on our concern regarding the proposed longer term measures involving decoder interfaces and standards for digital transmission, compression and access control interfaces. The discussion that follows is presented in the context of future digital transmission and access control, but is equally relevant in the context of analog scrambling and access control.

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[3] The second and third short term measures the NCTA-CEG is proposing are the use of second timer controlled converter/descramblers - or a single unit with two converter descramblers for subscribers with subscriptions to two or more scrambled channels in order to addresses their need to sequentially tape two programs at different times or watch one scrambled channel while recording another. Since these proposed devices have advanced timer and programming features and functionalities that replace those functions in TV's and VCR's, these proposed "solutions" promote the functional displacement of consumer interface features from consumer electronics equipment supplied in a robust competitive consumer electronics market environment, only to be supplied in subscriber equipment that is coupled with monopoly services. Thus, the NCTA-CEG proposals would lead to the enlargement of the proprietary set-top descrambler base that by its current nature can only be supplied by the cable company. This measure is in direct contradiction with the statutory requirement to promote the commercial availability of subscriber equipment from retail vendors that are not affiliated with cable systems [See §624A(c)(2)(C)].

## 2 THE COMMISSION MUST RECOGNIZE THE PUBLIC INTEREST IN DEFINING THE ROLES AND TRUE BOUNDARY LINES DELINEATING BETWEEN THE ACCESS CONTROL AND CONSUMER ELECTRONICS FUNCTIONS.

In their Supplemental Comments, the NCTA-CEG propose to include the "Decoder Interface" feature in the definition of "Cable Ready" TV's and VCR's. NCTA-CEG states that "The Decoder Interface on the back of TV's and VCR's allows appropriate signals to exit and enter the TV or VCR for external descrambling or decryption"[4]. Perhaps by the very nature of this compromise language, the exact processing meaning of "descrambled" or "decrypted" or the characteristics of the "appropriate signals" to be so processed is left vague. Needless to say, by their own Comments and Reply Comments in this Docket, the two groups making up the NCTA-CEG body have different opinions as to the proper definition and roles for a "Decoder Interface". As explained below, even if they do find some agreement among them, there is serious concern that while their agreement may serve the interests of both industries, it will not be in the best interest of consumers.

### 2.1 The Hardware and System Distinction Between Decoding Functions and Cryptographic Functions

In order to frame our discussion on the issues of access control interfaces, we begin by a short exposition of terminologies and principles that in one form or another are present essentially in all television access control systems. Figure 1 shows various decoder interface configurations. In Figure 1(a), the well known stand-alone cable converter/decoder is shown to perform the tuning function, the descrambling or decoding function and the function of remodulation of a clear signal that is subsequently fed to the input of the subscriber's consumer electronics equipment such as a TV set or a VCR.

Figure 1(b) shows an embodiment of a decoder interface whereby the tuning and conversion functions are performed in the TV set (or the VCR) and the received signal is

[4] NCTA-CEG Supplemental Comments at 10.

provided to an outboard decoder module through an IF interface port[5]. In this configuration, a demodulator is built-in the decoder module whereupon its output signal consisting of an encrypted bit stream is combined with a decryption keystream provided from a secure Access Control Unit to produce a decrypted (clear) bit stream that feeds the decompression circuit. Baseband video and audio signals are then provided from the decompression circuit to the consumer electronics appliance through the Baseband Interface port and the Interface Circuitry in both units. When unencrypted (clear) signals are received, the demodulator-decoder (decompressor) unit built-in the consumer electronic appliance is used, whereupon a decoder module will not be required.

The Access Control Unit within the decoder module receives from the demodulator the Access Control Messages. Those messages in turn are decrypted using the (unit specific and unique) secret information that is securely embedded within a secure enclosure, in order to produce the correct keystream for authorized decoding of the program. It should be clear that the Access Control Messages emanating from the demodulator contain no useful information to would be pirates, as these messages are encrypted under a key which resides or produced within the Secret Information sector of the Access Control Unit. Moreover, the keystream signal supplied from the Access Control Unit is equally useless to would be pirates, as it contains rapidly changing unpredictable key signals that continuously become obsolete every small fraction of a second[6]. Thus, no unauthorized physical access, tampering or otherwise modifying the demodulator-decoder and decompression unit (which contains a keystream controlled decoder) or the interfaces thereto, can result in any security compromise of the system. Such breach of decoder security can only come from the compromise of the secure content or workings of the Access Control Unit. Thus, from the standpoint of security, in a properly designed system, one must make a distinction between the **decoding** functions (that are responsive to a non secure decryption keystream) that may be performed in a non secure demodulator-decoder-decompression unit and a **cryptographic** function (responsive to secure

---

[5] Contrary to a suggestion by a party to this proceeding, for the digital modulation schemes contemplated by all digital transmission proposals, a video baseband interface cannot be used.

[6] Even if a pirate who electronically observes the rapidly changing keystream attempts to distribute it to others, he will require a clandestine real-time communication network to all other pirate locations. However, this approach will be unworkable for any practical application involving realistic distances due to propagation delays.

secret information which changes very infrequently) performed in a secure unit. The workings and operation of the demodulator, decoder (including its response to the keystream) and decompressor can be published, standardized and be supplied subject to genuine market competition.

Based on the above discussion, it should be clear that in new systems, there is no security reason for the functions of demodulation, decoding and decompression to be duplicated within the decoder and the consumer electronics appliance, just as there are no reasons that the tuner/converter functions be duplicated. Hence, the architecture of Figure 1(c) clearly emerges as optimal from the subscriber point of view. Here, the "Decoder Interface" is simply a keystream interface with an Access Control Unit that performs only the cryptographic functions in a secure enclosure such as a secure chip within a smart card or a Renewable Security module[7]. This interface approach for pay television has been successfully deployed for some 3.5 million subscribers of British Sky Broadcasting ("Sky") service in Europe[8] and is scheduled to be introduced in the U.S. on DirecTv's DBS system[9]. The ability to combine an Access Control decoding function within consumer electronics equipment without compromising the security of the cryptographic system is evidenced by the fact that such TV sets, VCR's and stand-alone decoders from competing vendors with smart card interfaces have been produced and made available to Sky subscribers in Europe. Attachment A shows advertisements of such products in Europe. It is not the widely published encryption method and decoder functions that determine the security strengths of a subscription security system. Rather, it is the physical security and the secrecy of the unit specific secret information, or keys embedded in the secure Access Control Unit. Hence, unlike some older cable scrambling systems, the security strength

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[7] We note that the economics and security advantages of such an approach have been recently utilized in the VideoCipher access control system used on C Band. The system has been recently converted to employ a Renewable Security Unit within the decoder module in order to predominantly perform cryptographic functions requiring security. See "Showtime Sets Commercial Upgrade" by Tom Middleton, Satellite Business News, Mar. 24, 1993, pp. 1, 22.

[8] See Comments and Reply Comments of News Datacom, In the Matter of Inquiry into Encryption Technology for Satellite Cable Programming, PP Docket No. 92-234, December 24, 1992; January 26, 1993.

[9] See Comments of DirecTV, Inc., In the Matter of Inquiry into Encryption Technology for Satellite Cable Programming, PP Docket No. 92-234, December 28, 1992.

of modern well designed security systems do not rely on any secrecy pertaining to their design or construct. The wide availability of such information through a standard setting process cannot detract from its security. For the same reason, subscriber ownership of such subscriber equipment (and a competitive supply thereof) cannot degrade the security of the system. There is absolutely no basis to assertions made by some cable industry parties to this proceeding that such standardized and nationally unified access control approaches are inherently less secure than present approaches.[10]

Because initially the installed base of consumer electronics equipment would not be configured in accordance with the interface schemes of Figure 1(c), configurations of stand-alone decoders such as Figure 1(d) are expected to be the dominant modes of providing access control to new digital services. However, these decoders will require no secret information to be embedded within, nor would they be a target of piracy attacks. These decoders can be produced based on a published and accepted standard and thus would be subject to competitive market forces. The wide availability of such decoders from cable operators and retail vendors that are not affiliated with cable systems would thus be encouraged as required by Section 624A(c)(2)(C) of the Cable Act. Security modules or smart cards containing the Access Control Unit can be supplied by the cable companies in order to authorize and provide selective access to each subscriber.

### 2.2 The Commission Must Favor Non-Duplication of Hardware in Consumer Electronics Equipment and Access Control Equipment.

The NCTA-CEG group recommends that the Commission prescribe digital standards governing transmission, compression and "standard security interface" system. We agree with the NCTA-CEG and wish to clarify that such standards should be based on the configurations in accordance with Figure 1 (c) and (d). these configurations, that over time should ultimately lead to the dominance of configuration Figure 1(c), are defined herein as "Keystream Interfaces", as they provide a delineation between decoding hardware and minimal embodiment

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[10] In fact, the NCTA Office of Cable Theft study "1992 Theft of Service Survey Results" issued in December 1992, points to a contrary conclusion: Despite the cable industry's employment of about a dozen different access control and scrambling systems with generally unpublished characteristics, it is estimated that service theft results in over $4.7 billion in unrealized revenue annually, some 24% of gross industry revenue in 1991.

of access control hardware that clearly seperate these function at the most efficient layer of keystream signals. The advantages of the keystream interface over other signal interfaces such as IF or baseband interfaces are as follows:

- Expanding the scope of hardware and systems that become subject to competitive supply. Allows unbundling of reception-demodulation-decoding hardware from access control hardware.
- Minimizing the redundancy of costly subsystems such as demodulators, decoders and decompressors. These systems' costs may reach several hundred dollars at the retail level.
- Provide higher level of security, flexibility and deterrence to pirates. The operator's ability to replace low cost security modules removes the economic incentive for pirate R&D investments in security breaches.
- Allows sharing of most functions required for Advanced Television reception with those of digital 525 line systems. (See discussion below).
- Unlike other interfaces, keystream interfaces can be easily expanded for the supply of two keystream signals for the simultaneous decoding of two channels for Picture-In-Picture ("PIP") or other advanced display functions. With one Access Control Unit providing dual keystream, this option will not require the provision of two decoders of the type shown in Figure 1(b) in every set or VCR designed with PIP features and the costly doubling of interface circuitry and sockets.[11]
- Allows multiple vendors for Access Control systems

### 2.3 Promotion of Competition in the Supply of Access Control Systems

Because the Access Control Unit interface information containing the protocol for the Access Control Messages and the Keystream signal specifications is a public standard, various vendors of access control systems can compete on the supply of such technology. These vendors may differ in their approach for supporting head-end services and billing interface capabilities

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[11] In digital TV applications, it may be possible to provide a PIP function without additional tuner by utilizing the channel multiplex and decompression capability within one carrier. Since only an infrequent still frame sample may be require in the PIP insert, sufficient buffering would allow both pictures to be processed and additional memory would be the only incremental costs for such "intracarrier" PIP modes.

as well as the implementation strengths of their security modules. It is important to recognize that a breach of security in one vendor's Access Control Units, does not impact the security of the installed decoder base. Rather, the Access Control Units (smart cards or security modules) can be replaced either with new improved units from the same vendor or from a competing vendor. Hence, the threshold for the displacement of Access Control vendor's technology is much lower in configurations of Figures 1(c) and (d) than that of Figure 1(b). This competitive tension should be a welcome development as it leads to reduced costs and improved security performance by Access Control vendors[12].

Another significant factor that should be kept in mind regarding access control standardization is the fact that topologies of cable systems are evolving and that several architectures involving multiple program origination sources (possibly controlled by different entities) may well be applied. These distinct program encoding sources may require the control of program access for the same subscriber equipment. Thus, the standardization of the full Access Control protocol as well as the transmission and compression standards will help guarantee the smooth transition from the architectures of Figure 2(a) to the type shown in Figure 2(b).

## 3 RELATION TO THE ADVANCED TELEVISION STANDARDIZATION PROCEEDING

The public interests that led to the Commission's decision to undertake the ATV standardization effort now in progress, included factors well beyond the fact ATV transmissions required spectrum allocation. The need to assure compatible equipment and competitive markets for ATV reception hardware was no less significant in the Commission's decision.

It is now anticipated that upon the adoption of an ATV standard, broadcasters will transmit digital ATV signals that many cable operators may (or likely be required to) carry on their system[13]. Manufacturers will manufacture TV sets with ATV capability and will offer

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[12] The suggestion that competitive access control suppliers might respond more rapidly to security breaches is offered by two other parties in connection with the satellite encryption proceeding. (See In the Matter of Inquiry into Encryption Technology for Satellite Cable Programming, PP Docket No. 92-234; PrimeTime Comments at 4; Scientific Atlanta Comments at 12-15.)

[13] While "Must Carry" rules do not yet extend to ATV transmission, the Cable Act states that "At such time as the Commission prescribes modifications of the standards for television

them for sale to the general public. It is important to emphasize the amount of overlap between the circuitry and hardware required for digital ATV receivers and that required for digital 525 line television service now contemplated by cable operators. These include the front-end low phase noise tuner/converter, precision IF SAW filter, QAM demodulator, adaptive equalizer, forward error correction unit, carrier and bit timing acquisition system, decompression circuits, digital audio demultiplexer-decompressor and stereo digital to analog conversion, a portion of video memory, NTSC encoder and remodulator, On Screen Display and consumer interface function. It is inconcevable that a subscriber who has purchased such a digital set would have to face the financial burden of bying a set-top device that essentially duplicates all of the above functions in yet another digital decoder which only differs from his ATV set by not displaying a larger number of lines in a wider aspect ratio.

The Commission must now recognize that the recent industry essential unanimity on the advisability of prescribing standards for digital 525 line TV points to the inevitable need to prevent a divergence of paths that would lead to costly duplication of hardware and confusion in the marketplace.

Rather, combining the ATV standardization effort with digital 525 TV standards will provide the opportunity for consumers and cable operators to share and leverage investments in digital television equipment for the benefit of both services.

## 4 THE COMMISSION MUST RESIST THE REPETITION OF PAST INACTION THAT LED TO PRESENT INCOMPATIBILITIES

The record in this proceeding is replete with explanations and historical accounts of the reasons for the present situation of access control equipment incompatibilities with consumer electronics. Titan believes that a significant contributor to the current situation is the long history of bundling the access control equipment supply with cable services. We submit that decoder interfaces that allow the furtherence of such bundling by the nature of the proprietary systems they require would be against the public interest. It should be clear to the Commission that while cable operators are the first instance "customers" of access control technologies that

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broadcast signals, the Commission shall initiate a proceeding to establish any changes in the signal carriage requirements of cable television systems necessary to ensure cable carriage of such broadcast signals of local commercial television stations which have been changed to conform with such modified standards." §614(b)(4)(B); (Emphasis supplied).

protect their signals, they have incentives to introduce considerations other than security in selecting a technology, in order to achieve other goals that do not necessarily align with the subscriber interest[14].

If security and costs considerations are satisfied, the public interest requires that factors relating to subscriber interests should weigh more heavily than the fact that there might be an accord between the cable and consumer electronics industries who both benefit from selling more costly hardware by agreeing on a compromise of configurations such as that of Figure 1(b).

## 5 THE COMMISSION SHOULD COMMENCE WITH INQUIRY AND RULEMAKING PROCEEDING FOR DIGITAL 525 LINE TV SYSTEMS WITHOUT DELAY

In light of the previous discussion, Titan believes that as a minimum, the Commission should institue an Inquiry into the standardization of digital television and the access control therefor. The issues in this type of a proceeding are of immense scope. The scope of such proceeding would perhaps be larger than that of ATV, since it includes access control and compatibility factors. We urge the Commission to make a determination and report to Congress in its upcomming report, whether it has sufficient resources to address these issues in order to discharge it's obligation under the Cable Act.

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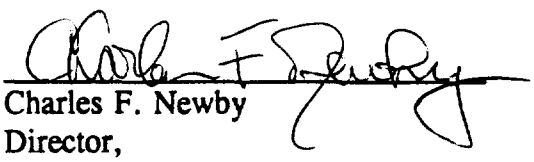
[14] We note that in another proceeding on the benefit of competitive supply of subscriber encryption equipment the Commission sided with the position of satellite programmers who favored "other security considerations" over the prospect of competitive supply to their subscribers of satellite decoding equipment by Titan's affiliate. In explaining its inaction, the Commission found that "programmers, the initial consumers of encryption systems--did not choose to utilize the proposed Titan system." (PP. Docket No. 92-234, Report Released April 29, 1993; FCC 93-175 at 12.) Here the Commission failed to acknowledge the fact that other considerations such as the fact that most cable satellite programmers are controlled by cable companies who have very little incentive to make the satellite equipment market more competitive. Any cost reduction of such satellite reception equipment results in increased competition to cable systems they operate. Thus, in this case the Commission failed to actually challenge in detail, the real considerations that led to programmer "disinterest". These matters can only be resolved with critical technical review of the merits raised by the parties. No such resources seemed to have been available to the Commission at that time :".. the complexity of the technical considerations prevents us from coming to any definitive conclusion";(Ibid at 12).

# 6 CONCLUSION

For the foregoing reasons, Titan respectfully recommends that the Commission adopt rules consistent with the Reply Comments herein in order to assure the expansion of competitive forces into the access control market sector and in order to assure compatibility between cable systems and consumer electronics equipment.

Respectfully submitted,

THE TITAN CORPORATION.

By: 

Charles F. Newby
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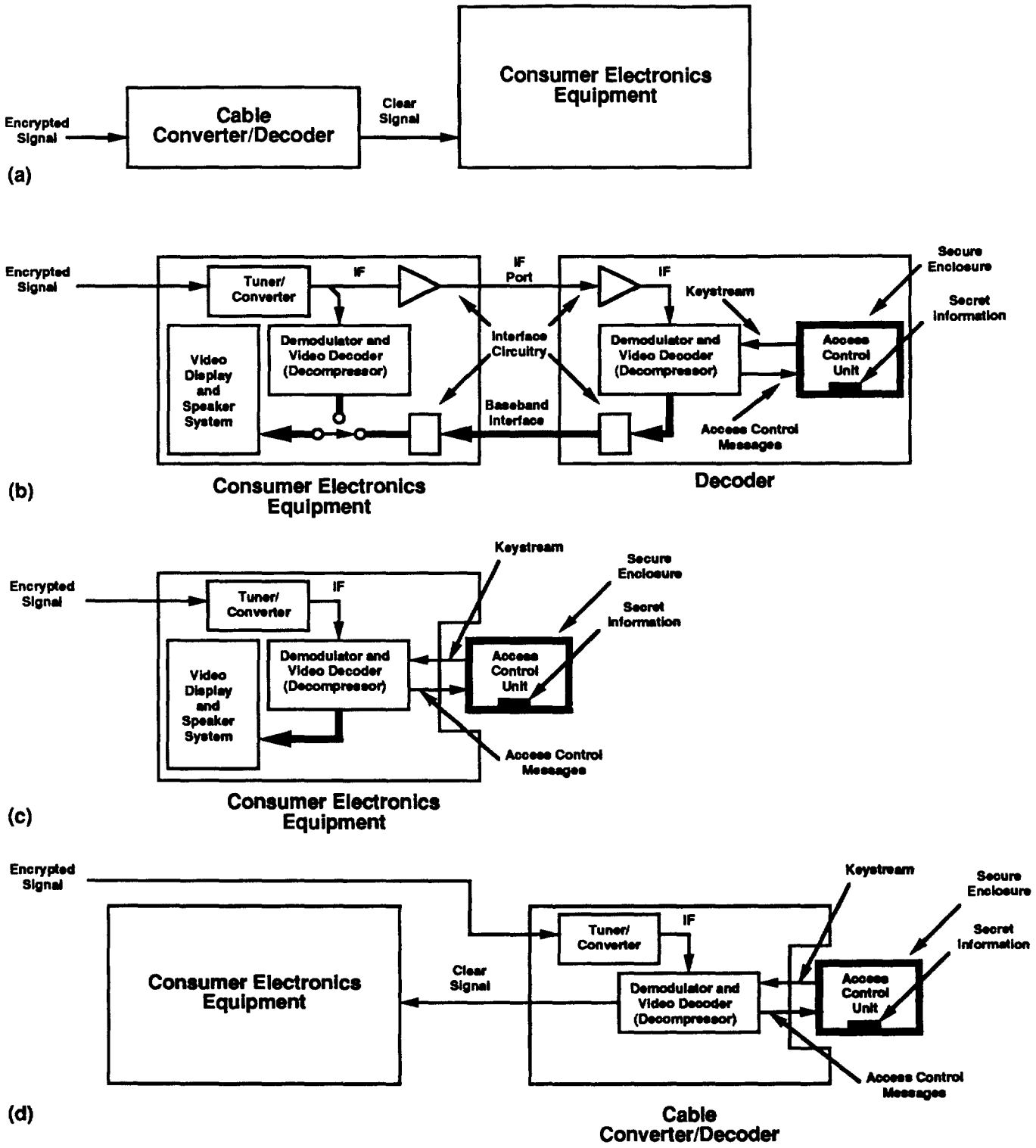
August 10, 1993


Encrypted Signal
Cable Converter/Decoder
Clear Signal
Consumer Electronics Equipment
(a)
Encrypted Signal
Tuner/ Converter
IF
IF Port
IF
Keystream
Secure Enclosure
Secret Information
Video Display and Speaker System
Demodulator and Video Decoder (Decompressor)
Interface Circuitry
Demodulator and Video Decoder (Decompressor)
Access Control Unit
Baseband Interface
Access Control Messages
(b)
Consumer Electronics Equipment
Decoder
Keystream
Secure Enclosure
Encrypted Signal
Tuner/ Converter
IF
Secret Information
Video Display and Speaker System
Demodulator and Video Decoder (Decompressor)
Access Control Unit
Access Control Messages
(c)
Consumer Electronics Equipment
Encrypted Signal
Keystream
Secure Enclosure
Tuner/ Converter
IF
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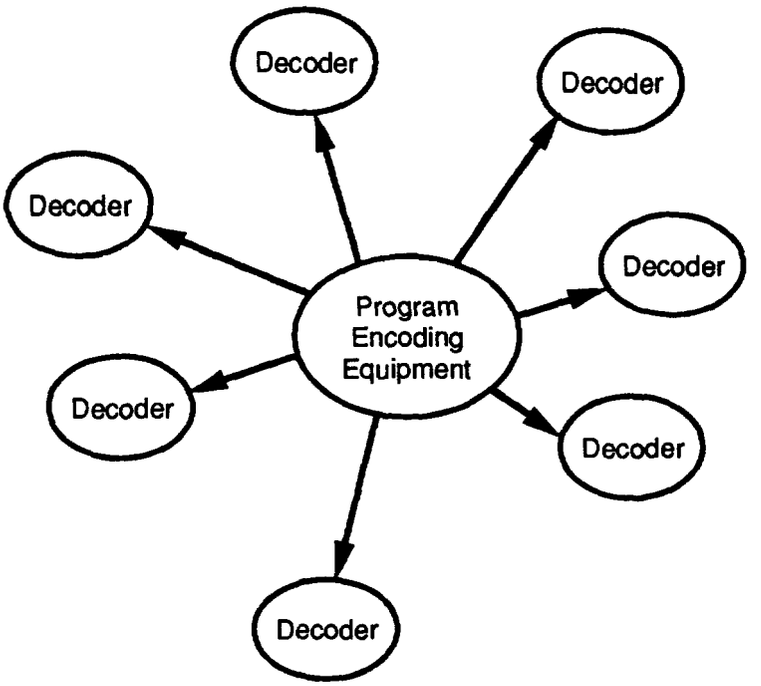
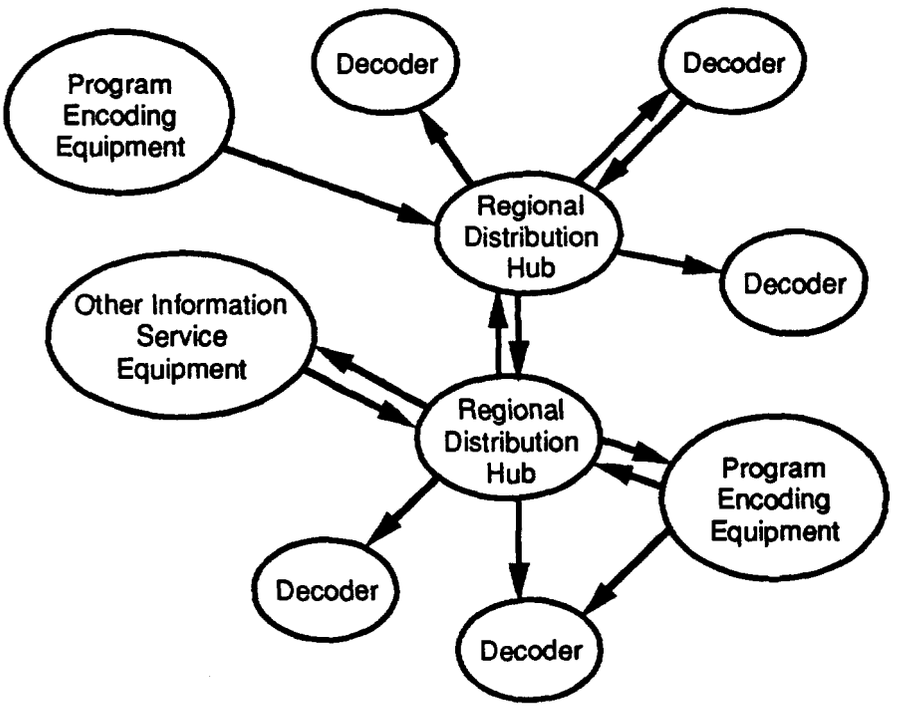
Access Control Unit
Access Control Messages
(d)
Cable Converter/Decoder

Figure 1


Decoder
Decoder
Decoder
Decoder
Program Encoding Equipment
Decoder
Decoder
Decoder

(a)


Program Encoding Equipment
Decoder
Decoder
Regional Distribution Hub
Decoder
Other Information Service Equipment
Regional Distribution Hub
Program Encoding Equipment
Decoder
Decoder

(b)

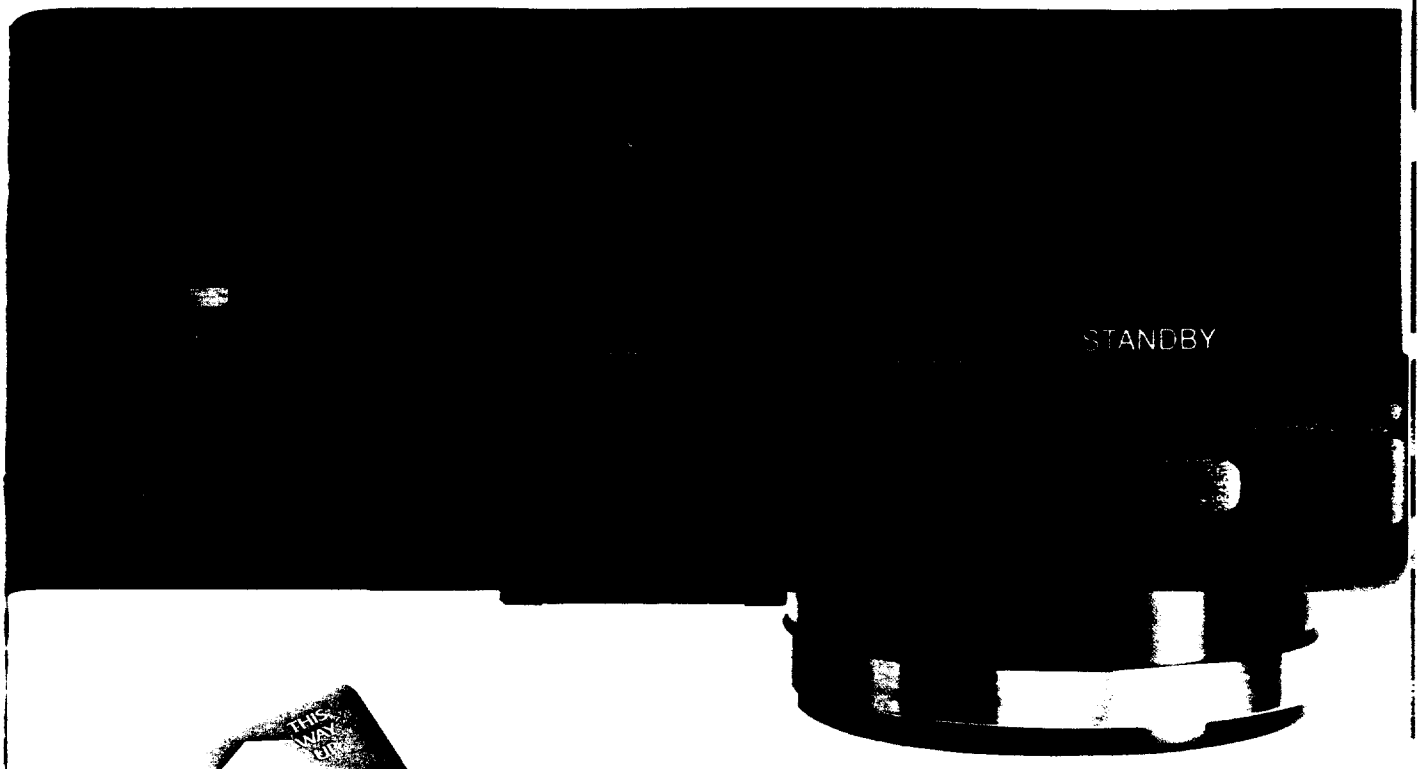
**Figure 2**

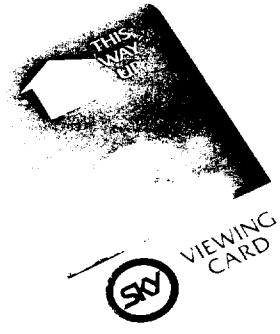
# Attachment A

1. EchoStar IRD With Smart Card. "Cable and Satellite Europe", March 1993, page 31.
2. Connexions IRD With Smart Card. "Cable and Satellite Europe", March 1993, page 37.
3. Amstrad TV With Smart Card. "Cable and Satellite Europe", November 1991, page 7.
4. Amstrad VCR With Smart Card. "Cable and Satellite Europe", October 1991, page 9.
5. Maspro IRD With Smart Card. "Cable and Satellite Europe", September 1991, page 74.
6. Pace Decoder With Smart Card. "Cable and Satellite Europe", March 1993, page 74.

# ECHOSTAR SR-7700 IRD

## Satellite Receiver with SatTrack

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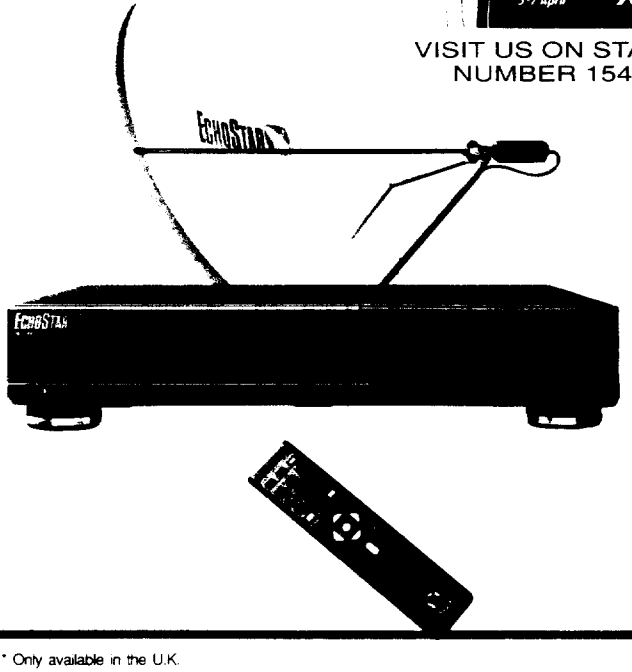


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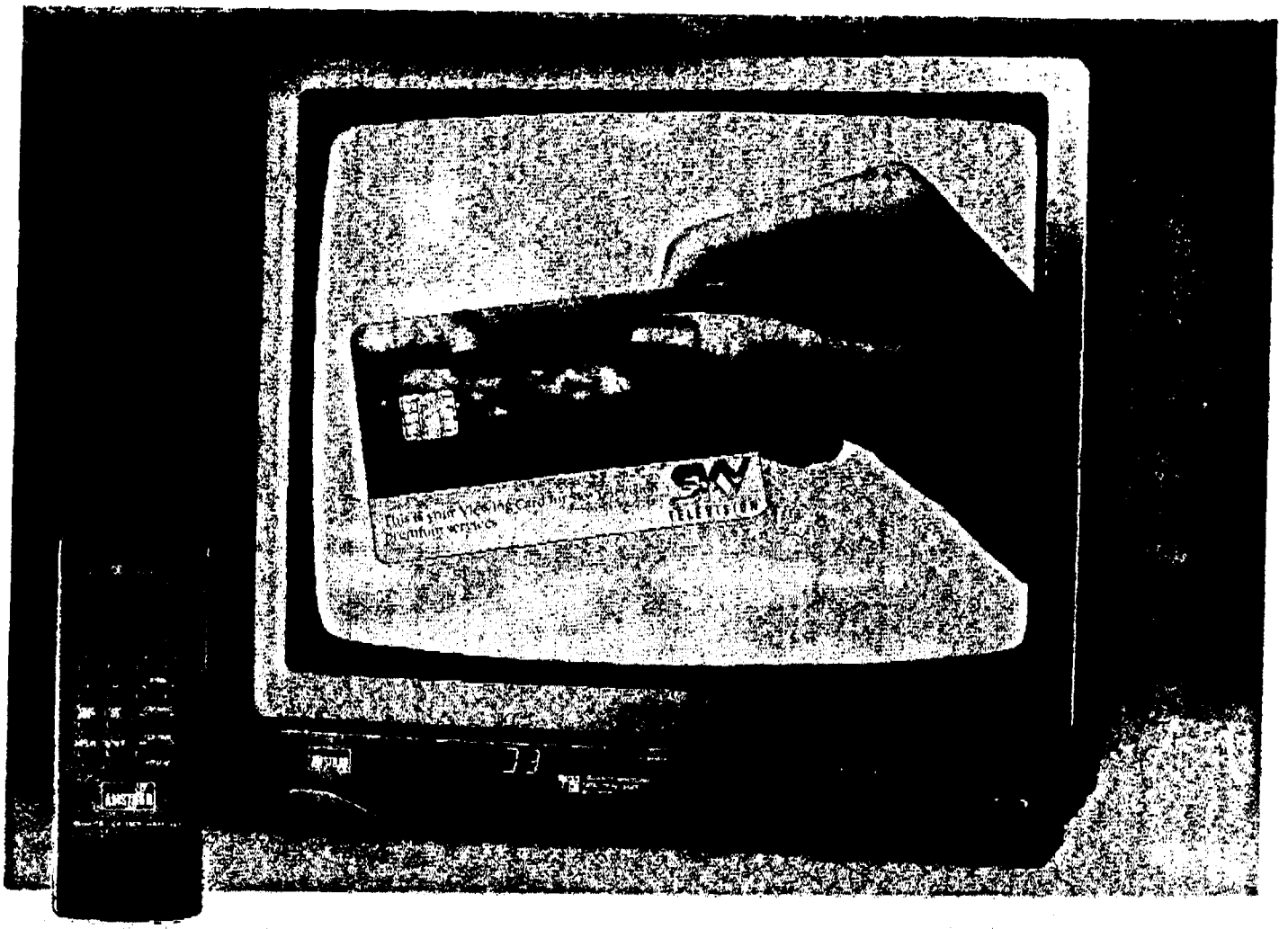


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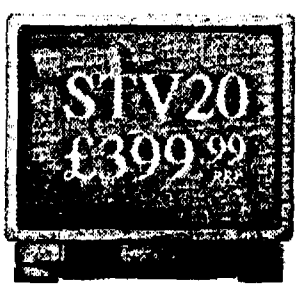


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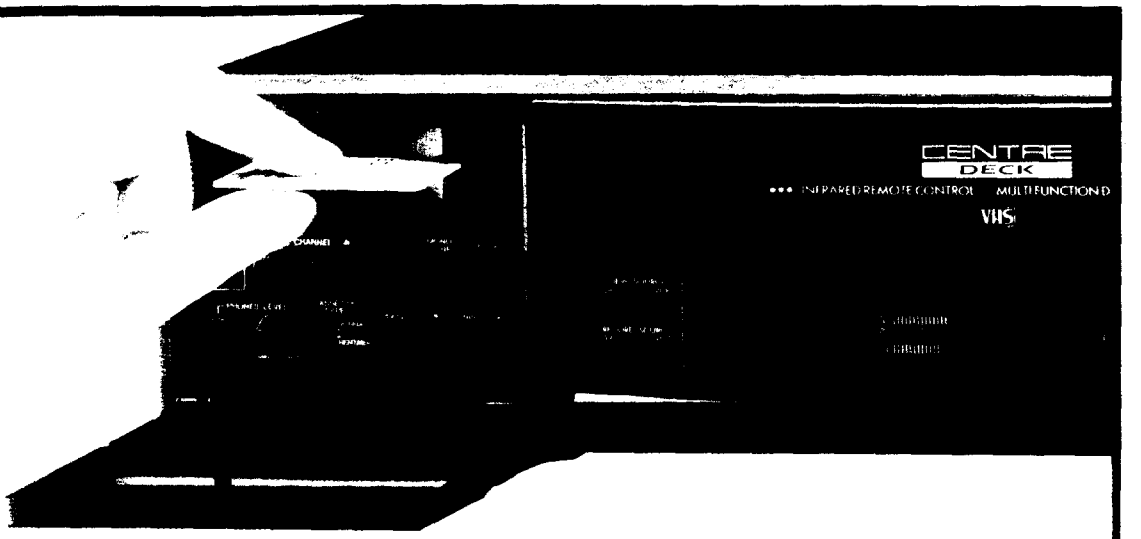
For a 20" remote control TV incorporating a 48 channel satellite receiver and decoder, on screen graphics, Wegener stereo sound and an alarm/sleep timer, the STV20 offers incredible value retailing at a modest £399.99 inc VAT (RRP)*.

High impact TV commercials are sure to create big demand - so make sure your stocks are sufficient.

For further details of the remarkable STV20 phone the Amstrad Dealer line on 0277 209209.

Plus files
dow' test




# THE VIDEO RECORDER THAT KILLS TWO BIRDS WITH ONE STONE

Trust Amstrad to come up with another satellite product of vision - *a video recorder with a built-in satellite receiver and Sky decoder.*

It's a natural winner - for customers and for you - because it opens up so many more sales opportunities.

- Existing satellite customers who are thinking of buying a video recorder must buy this one, because now they can enjoy the benefits of watching one satellite programme whilst recording another satellite channel.

- Non-satellite customers offer an even more exciting sales prospects - imagine how these customers, coming in to buy an ordinary VCR, can easily be persuaded to kill two birds with one stone and buy the one with a satellite receiver and decoder built in - thus allowing them to enter the world of satellite TV for around the same price they would pay for a normal VCR. It's a powerful sales story!.

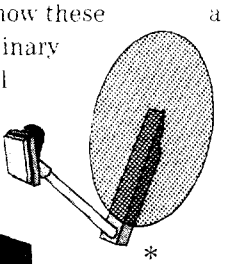
*So stand by for more dish sales!*

Both satellite video recorders in the Amstrad range incorporate a 48 channel receiver; a programmable remote control; 4 event / 1 month timer, and quick start record and play.

The VS1000 retails at £399.99* and the VS1140 with NICAM stereo and 4 head for perfect still and slow motion, retails at £499.99*.

High impact TV commercials are sure to create a big demand - so make sure your stocks are plentiful.

For further details of the remarkable Amstrad satellite video, Phone the Dealer Line on 0277 209209.



VS1000
£399.99 R.R.P.
INC VAT

AMSTRAD

VS1140
£499.99 R.R.P.
INC VAT

PRODUCTS • DTH

## NEW MASPRO DESIGNS

Maspro has entered the battle for pre-Christmas purchases with the introduction of the SRE300S. The design owes more to video recorders than recent satellite receivers with a large LED display and channel indicators. 70 pre-programmed channels include Astras 1A, B and C. In addition to basic features the receiver includes two programmable skew pairs for each stored channel: this allows the polariser to be moved to a more beneficial position in the event of interference. Ten programmes can be stored, and the childproof lock prevents unwanted viewing by tiny eyes. The W/N button allows deviation between different satellites to be compensated by varying the modulation of the video channel. The SRE350S IRD includes a built-in Videocrypt decoder.

Maspro is hoping that its new BSK65E dish will give a high degree of reflection precision. Both feedhorn and polariser operate on the principal of electromagnetic signal processing to enable exact transmission of horizontal and vertical signals.

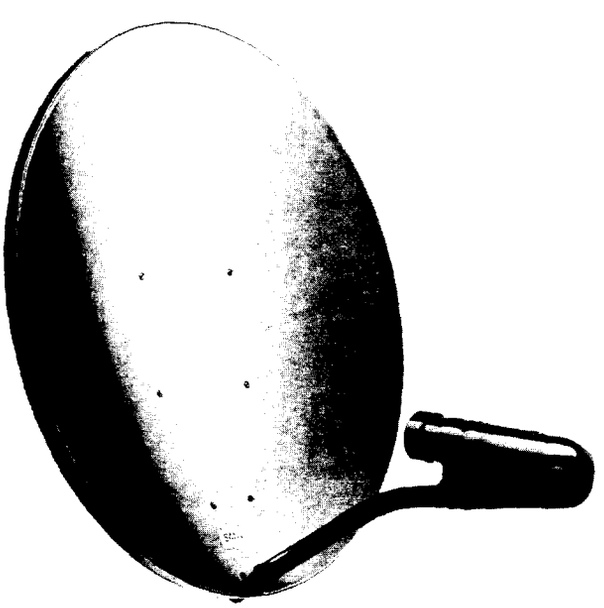

Retail price for the SRE350S IRD, complete with 60cm dish, is £349.95, with a trade price of £239.95.

The BSK65P brings the perforated dish to the Maspro range. The decision to make the antenna the offset reflector type was taken to get the best picture quality, often a problem with mesh antennas.

Contact: C. Itoh Communications,
Schiess Strasse 74-76
4000 Düsseldorf 11, Germany
Tel: +49 (211) 596424

## THREE COURSE DISHES

Swedish Microwave is expanding its range of dishes following the establishment of its antenna division SMW Antenn. The company is manufacturing dishes for both the Scandinavian and continental European markets. The full development of the products should be complete by the autumn, but the company has already announced three complete outdoor units which will be included in the range.



The 65cm offset dish SMWODU-650 is made of steel and comes complete with 1.2 dB LNB and feed rotor. Samples will be available by the end of September, with full production commencing in November.

The next dish up, the 85cm SMWODU-850 will be available with an Az/El mount as well as the polar mount. A 1.2dB dual or single band LNB is included together with the feed rotor. Samples are expected in October, with full production in December. The ODU1050 carries the same specifications as the 850, but with dish size increased to 105cm. Samples will be available in November and production starts in December.

Contact: Swedish Microwave,
Box 230, S-591 23 Motala,
Sweden
Tel: +46 (141) 161 35
Fax: +46 (141) 152 24

## PYRAMID LEADS

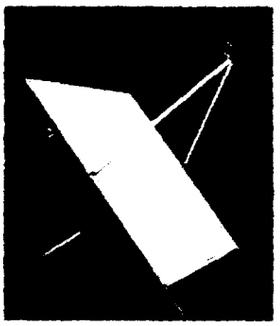
The Pyramid range of ready-assembled drop leads is now available through UK distributor ABP. The leads are constructed from Times Fiber or Comm/Scope RG6 and RG59 (67 per cent) braid/foil co-ax. The black or white leads are available in standard lengths, 1.0, 1.5, 1.8 and 2.0 metres with custom length cables available on request.

Also available are Belling Lee male and female connectors, available in RG59 and RG6 versions, and accommodating any RG59 or RG6 cable, regardless of manufacturer.

Contact: ABP, 9 Campbell Court, Campbell Road, Bramley, Basingstoke, Hants, RG26 5EG
Tel: +44 (256) 881525
Fax: +44 (256) 882866

# INNOVATIONS

## Portasat thinks bigger



Portasat, the company responsible for the novel deckchair-style fold-away portable 60cm antenna, has designed and put into production a square, 1.2m version of the concept. The unit is supplied as four 60cm square panels which are assembled within a metal frame.

Gain, according to Portasat, is in excess of 41dB, with beamwidth less than 1.5 degrees. The company intends to market the product to caravan and mobile home owners across Europe, as an inexpensive and simple way of doubling the area in which they can view Astra channels, as well as allowing them to tune into Eutelsat and Intelsat signals. It is particularly targeting visitors to Spain, where a larger dish size is required.

Portasat has now refined the 60cm circular flat-zone plate antenna and will be re-launching the unit — which uses new materials and different manufacturing techniques to the original product.
Contact: Portasat Ltd, PO Box 62, Letchworth, Hertfordshire SG7 5RY
Tel: +44 (462) 742854
Fax: +44 (462) 742893

## Connexions return

Back in the UK market after an absence of three years, Connexions is introducing two new receivers. The oldest satellite receiver manufacturer in the UK, Connexions is taking advantage of what it sees as a window of opportunity following recent price increases by market leaders Pace and Amstrad. The past three years have seen Connexions concentrating on the export market.

The CX95A IRD provides 99 channels retunable across video (950-2050MHz) and audio (5.0-6.8MHz). It comes with remote control, switchable audio bandwidths, audio de-emphasis and Panda Wegener Stereo.

The CX200 is aimed at the motorised market with 200 re-programmable channels (again with tuning from 950-2050MHz), a four-week, eight-event timer, triple audio bandwidths, three-language on-screen graphics, a 50-satellite position memory and parental lock.

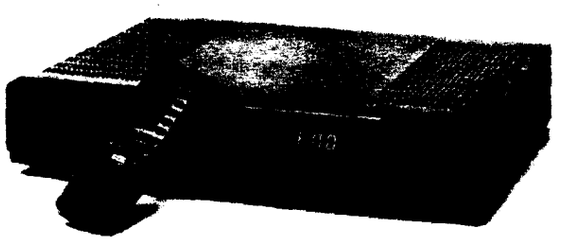
Retail price for the CX95A IRD is £279, while the CX200 is £299.
Contact: Tony Hook, Connexions, Unit 3, Travellers Close, Welham Green, Hertfordshire AL9 7LE
Tel: +44 (707) 272091
Fax: +44 (707) 269444

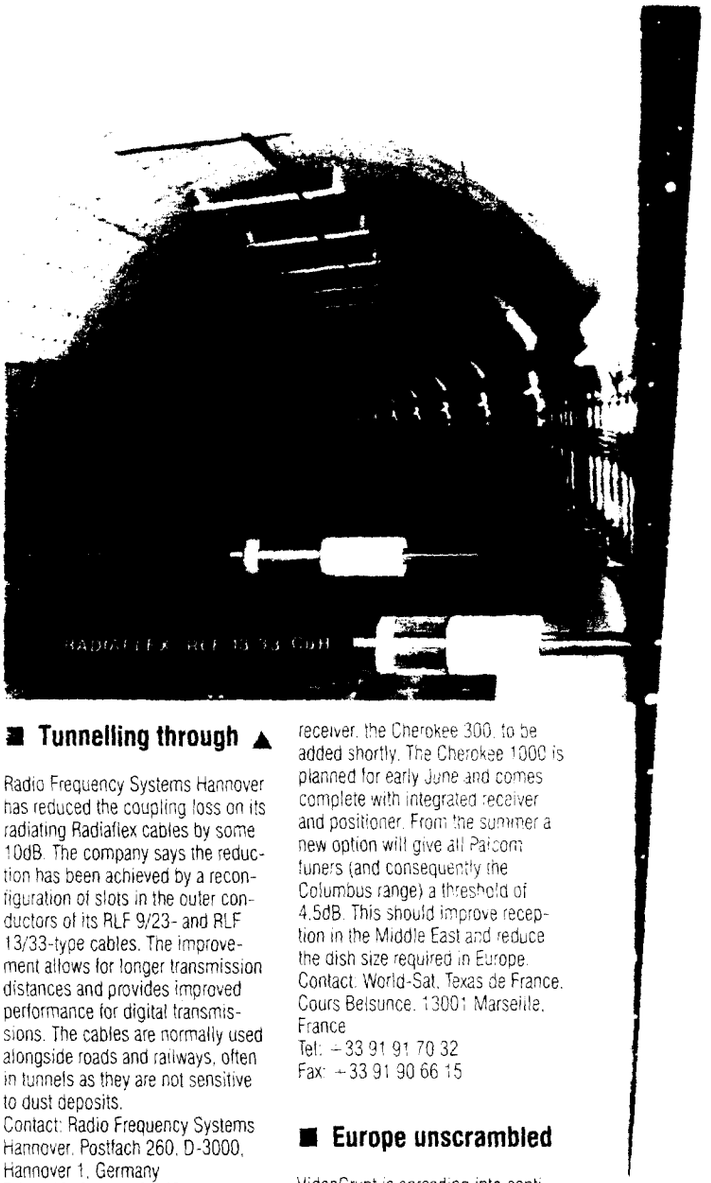
## Communicado gets the Best

Communicado has acquired UK distribution rights to Best receivers and will launch an IRD/dish/LNB package this April, backed by a promotional campaign for independent dealers.

The system is based on the Best 97 IRD, featuring 99 programmable channels with the unique channel swap facility to avoid time-consuming retuning, twin scart sockets, auto contrast control, Wegener-compatible stereo and fully tunable audio.

The package will retail at £229, and will be launched together with a range of incentives and point-of-sale materials for dealers at the Cable & Satellite Show in London next month.
Contact: Communicado, Unit 3, Noke Lane Business Centre, Noke Lane, St Albans, Hertfordshire AL2 3NY
Tel: +44 (727) 810810
Fax: +44 (727) 810161





## Tunnelling through

Radio Frequency Systems Hannover has reduced the coupling loss on its radiating Radiaflex cables by some 10dB. The company says the reduction has been achieved by a reconfiguration of slots in the outer conductors of its RLF 9/23- and RLF 13/33-type cables. The improvement allows for longer transmission distances and provides improved performance for digital transmissions. The cables are normally used alongside roads and railways, often in tunnels as they are not sensitive to dust deposits.
Contact: Radio Frequency Systems Hannover, Postfach 260, D-3000, Hannover 1, Germany
Tel: +49 (511) 676 3733
Fax: +49 (511) 676 3178

## World-Sat discovers Columbus

At the high-end of satellite receivers, World-Sat has launched the Columbus range of receivers. The low threshold units, manufactured by Palcom in Japan and Malaysia, have been tested in the Middle East and Africa with, says World-Sat, "brilliant results."

The Cherokee 100 comes with 100 channels, two scart sockets, phono sockets, tuning from 950 to 1750MHz, on-screen graphics in English, German, French and Spanish, and video timer. The 200 provides an additional LNB input plus tuning up to 2050MHz and two video bandwidths (27/18MHz).

The Columbus Cherokee 100 and 200 are available now with a third receiver, the Cherokee 300, to be added shortly. The Cherokee 1000 is planned for early June and comes complete with integrated receiver and positioner. From the summer a new option will give all Palcom tuners (and consequently the Columbus range) a threshold of 4.5dB. This should improve reception in the Middle East and reduce the dish size required in Europe.
Contact: World-Sat, Texas de France, Cours Belsunce, 13001 Marseille, France
Tel: +33 91 91 70 32
Fax: +33 91 90 66 15

## Europe unscrambled

VideoCrypt is spreading into continental Europe and Scandinavia with the arrival of the Pace VC100

decoder. The stand-alone unit consists of a smart card reader and a switching unit to change between flat and Pal de-emphasised. The decoder was previously restricted to the UK market where it is required to decode four of the six Sky channels and a growing number of other broadcasters. On a pan-European